

## ARSG Technical Work Group Meeting Summary

11/18/14

ATTENDEES (INCLUDING THOSE ON THE PHONE): Peter Butler, Steve Fearn, Dan Wall, Paula Schmittiel, Tom Schillaci, Brent Lewis, Lisa Richardson, Kirstin Brown, Kay Zillich, Larry Perino, David Heinze, Bill Simon, Camille Price, Jason Willis, Steve Sample, Joe Lewandowski, Buck Skillen.

Peter started off the discussion by reviewing data we have on the Animas River. First the group looked at preliminary electro-shocking data from an event in late September. Unfortunately the water was too high to safely shock Elk Park and A72. We believe DPW shocked the Animas near Howardsville, but we don't have the data yet.

Overall, the Animas fish data in and below Durango and near Cascade Creek showed slight declines in fish population from 2010. The numbers at Cascade Creek were much worse in 2010 than 2005 and 1999. Fish populations near Howardsville (above Cement Creek) were much improved in 2010 and 2005 from surveys in 1999. There were several remediation projects done upstream from Howardsville during the intervening years.

The group looked at water quality data lower on the Animas and worked its way up. Peter examined data from 2013 through the first half of 2014 at Trimble Lane and Bakers Bridge. At Trimble Lane, all aquatic life water quality standards are met. At Bakers Bridge, chronic standards for protection of aquatic life are not met for iron, aluminum, cadmium, and zinc. Acute zinc standards are also exceeded. Chronic and acute zinc standards are very close in terms of concentrations.

There is not much aquatic life toxicity data for iron and aluminum at the high pH's seen at Bakers Bridge. The main deleterious effect is the smothering of the substrate which inhibits macroinvertebrates. A large proportion of these two metals are thought to come from natural sources, and their impact is probably less than zinc and cadmium. Aluminum concentrations below Silverton have hardly changed since the new, untreated discharges began in upper Cement Creek. Yet fish populations and number of trout species in the Animas above Bakers Bridge have plummeted since the discharges began. The discharges have greatly increased zinc and to a smaller degree cadmium loading in Cement Creek and the Animas. These two metals tend to occur together and if one is removed the other often is as well. In general, zinc has been the primary focus of ARSG.

In reviewing the data, the subbasin contributions for each of these four metals at A72 can vary throughout the year. For example, in the fall to early spring, Cement Creek is the biggest load contributor for all four metals, but the Animas River above Cement Creek is the biggest contributor of zinc and cadmium from spring through summer. Little of the aluminum and iron comes from the Animas throughout the year. Mineral Creek contributes much more aluminum and iron than the Animas, but much less zinc and cadmium (partly because of all the remediation done in that subbasin). See the graphs in the attached file.

While ARSG's main focus has been upper Cement Creek, EPA has been looking more closely at the Animas above A68 (above the confluence of Cement Creek and the Animas). Metal concentrations at A68 peak in April with manganese, zinc and cadmium concentrations all above chronic Table Value Standards (TVS) for aquatic life. Acute TVS zinc and cadmium standards are also exceeded.

ARSG has long recognized these high metal concentrations at A68, but has been unable to identify

historic mine sites that are major contributors of this load. Some of the inactive and abandoned sites in this subbasin have high metal concentrations, but the loads relative to the total load at A68 are small (See below). ARSG has not attempted to evaluate potential loading from permitted sites, the Howardsville mill and the Sunnyside tailings ponds. ARSG has avoided involvement in permitted sites in order to maintain its collaborative process. Supposedly, if permit conditions are being met, a permitted site should not be a big source of loading. There is metal loading from tailings mixed in the alluvium in the braided channel of the Animas below Eureka, but ARSG has been concerned that digging up the waste would cause more environmental damage than environmental benefits.

The group then looked at metal data collected weekly in late March through early May this past spring at the Howardsville gage and A68. Snow on the south facing slopes along this stretch of river usually melts off during this period, before the main snow melt and runoff begins in much of the rest of the basin. Unfortunately, because of ice there is no flow data at A68 until early April so that we are unable to calculate metal loads at A68 in March.

This data (attached) shows that in early April, the vast majority of the three metals of concern at A68 enter the river between the Howardsville gage and Silverton: 80% + of the zinc, 90% of the cadmium, and 95% of the manganese. By late April, on days that appear to be warm, flows are much higher and metal concentrations at A68 have been cut at least by half. During these days the percentage of metal loading entering between the Howardsville gage and Silverton drops substantially: 35% of the zinc, 45% of the cadmium, and 80% of the manganese (*i.e.* a higher percentage of loading comes from above the Howardsville gage). By July 1<sup>st</sup>, when metal concentrations are much lower at A68 than in the spring, most of the metal load comes from above the Howardsville gage. The percentages of load entering between the Howardsville gage and Silverton drops to: 15% of the zinc, 30% of the cadmium, and 45% of the manganese.

In addition to discussion of this recent sampling data, the group discussed tracer studies conducted by USGS on this stretch of river and on parts of the Animas farther upstream. Most of the focus was on two tracers; one done between Howardsville and A68 on August 31, 2002 – a record setting low flow for that time of year, and the other on April 16, 2003. Flows measured in August 2002 were quite similar to flows usually seen in the Animas in mid-winter. The zinc and manganese concentrations and flows near Howardsville and at A68 in April 2003 were quite similar to those seen this past mid-April in the attached spreadsheet.

During the August 31, 2002 tracer, most of the sampled inflows (seeps and springs) with high metal concentrations were on the right bank when facing downstream with the exception of some inflows near the Aspen mine. Arrastra Gulch had minimal impact. During the April 2003 tracer, inflows from near the Aspen mine didn't appear to affect metal concentrations in the Animas.

The group then moved towards a discussion of what remediation could be done to reduce metal loading in the Animas basin above Silverton. During low-flow, about 100 lbs/day of zinc flows through A68. During peak runoff, the figure jumps to approximately 900 lbs/day. ARSG has identified 18 lbs/day of zinc flowing from the major adits upstream of A68, none of which contribute more than four lbs/day individually. There may be a few more lbs/day from the rest of the adits that have been sampled.

ARSG has previously estimated that there is 1,612 lbs/yr (4+ lbs/day average) of zinc loading from unpermitted major mine waste piles above A68 after subtracting the Lucky Jack mine dump which has been remediated. Most of this loading is thought to occur during runoff and around storm events.

In general, removing or encapsulating mine waste is much less expensive than treating mine drainage. Peter asked if hypothetically it was determined that much of the metal loading to the Animas in April from Howardsville to A68 came from the Sunnyside tailings ponds, other than treating water, what could be done reduce metal loading. The ponds have been graded, capped, revegetated, and a diversion ditch was dug down to bedrock above the ponds. Moving the ponds would be extremely expensive and disruptive to the community, and where would they be moved to? There weren't any suggestions. The ensuing discussion centered on the possibility identifying seeps and springs from underneath the ponds, capturing the drainage and treating it.

The group ended the meeting with a discussion about where BLM could potentially treat mine drainage on a small scale, excluding the American Tunnel and the major draining adits in upper Cement Creek. Bill expressed a desire to have BLM re-visit conducting pilot tests of treatment options at the American Tunnel. Brent Lewis explained that if BLM applies to the Dept. of Interior's Hazardous Waste Fund, the first question would be are there any PRP's that BLM can pursue to cover or reimburse costs. Initially, he wanted to work on sites where there were no identifiable PRP's.

Several sites were discussed, including private sites that impact BLM land. Outside of the American Tunnel, the only priority adit drainages for ARSG on BLM land are the Joe & Johns and Evelyn. Land around the Joe & John's is steep and not very suitable a treatment system. Drainage from the Evelyn could be piped to a level area. Peter said he would compare the metal concentrations at the Evelyn to those at the American Tunnel to see if they were comparable. If they are, perhaps applying treatment options on the Evelyn could be useful in designing solutions for the American Tunnel.